WellAV Technologies Ltd

# AD-160
# HD Integrated Receiver Decoder
## User Manual

## AD INSTRUMENTS

Http://www.abacantodigital.com

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# Safety

- To avoid electric-shock hazards, do not open the receiver; refer service to qualified personnel only.
- Keep the receiver away from flower vases, tubs, sinks, etc., in order to avoid damaging the equipment.
- Do not expose the receiver in the sunlight. And keep it away from the heat source.
- Do not block ventilation holes of the Receiver so that air can circulate freely.
- When the abnormal phenomenon occurs, cut off the power immediately.
- Do not touch the receiver during thunder. That might create electric shock hazards.
- Switch the receiver off whenever it remains out of service for an extended period.
- Be sure to turn the receiver off and disconnect the AC power cord before cleaning the receiver surface. If the surface is dirty, wipe clean with a cloth that has been dipped in a diluted soap water solution and wrung out thoroughly, and then wipe again with a dry cloth.
- Specifications and functions may be changed for improvement without notice in advance.

# Reference

- Connect a Antenna

To AD160 IRD, you can connect either a single satellite antenna directly or through converter box several antennas or LNB of multi-feed equipment.
You can connect a further IRD with the IRD that has common antenna equipment to receive satellite signals.

- Loop Through

If you wish, you can connect the same LNB to another IRD via the loop through of your digital receiver decoder. Connect one end of a coaxial cable to the LNB OUT on the IRD and connect the other end to the LNB IN on your second IRD.

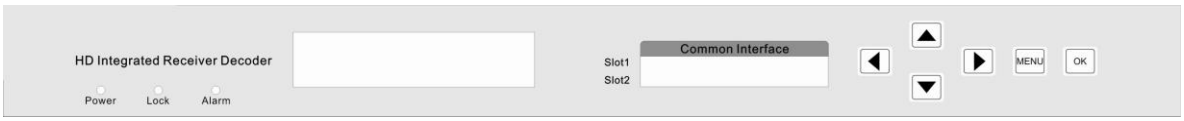
# Features

- MPEG-4 AVC (H.264) Digital compliant
- DVB-S2/C/T signal input support (optional)
- For DVB-S/S2 model, input Frequency 950-2150 MHz, Symbol Rate 2 ~ 45 Ms/s (2-37Ms/s for 8PSK); for DVB-T model, input Frequency 48-858 MHz, Symbol Rate 0.87 ~ 6.9 Ms/s; for DVB-C model, input Frequency 50-858 MHz, Symbol Rate 0.87 ~ 6.9Ms/s
- 1 Tuner Input (F-Type) and Loop-through
- 2 DVB Common Interfaces (CI ) for descrambling most common CA systems
- 1 ASI transport stream input & 2 ASI output capable of working as TS decoder
- IP stream input and output (optional)
- Broadcasting quality video and audio outputs
- VBI Teletext handling
- 2 identical SDI outputs for convenient conversion of program format
- AES/EBU digital audio output
- BNC-interfaced CVBS output with the companion of AES/EBU audio output makes better sense.
- HDMI output with high quality video and audio gives an audiovisual feast
- Full control via front panel or Ethernet port
- Automatic recovery for latest system configuration from unexpected power off
- Software upgrading via NMS

# Introduction

The AD160 IRD is an advanced MPEG-4 AVC (H.264) HD integrated receiver decoder with optional TS-IP mutual conversion function. It can receive signal from different program sources. Its prolific output interfaces such as IP, SDI, AES/EBU, HDMI and ASI can meet different system requirements. The AD160 also has 2 common interface slots which can decode multiple scrambled channels. It is an ideal component for either a standard SD/HD digital video or an IPTV head-end system.

## Front Panel




**LED Indicator:**

Power: The LED lights on when the STB is power on.

Lock: The LED lights on when a channel is locked. Otherwise there is no channel locked.

Alarm: The LED flickers when there is something abnormal. For example, the strength of the input signal is too weak.

**Display screen:** Show the channel name of TV or Radio program and the configuration information.

**CI SLOTS:** There are two CI slots for various CAS CAM (PCMCIA) modules.

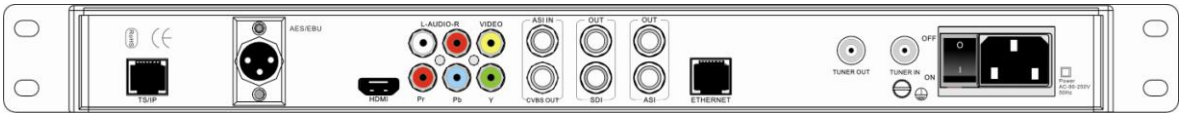
**KEY PADS:**

Select Keys: To change channels, adjust volume and configure the IRD.

MENU: To enter the menu and the quit function of the sub menus.

OK: To confirm the operation in the setup.

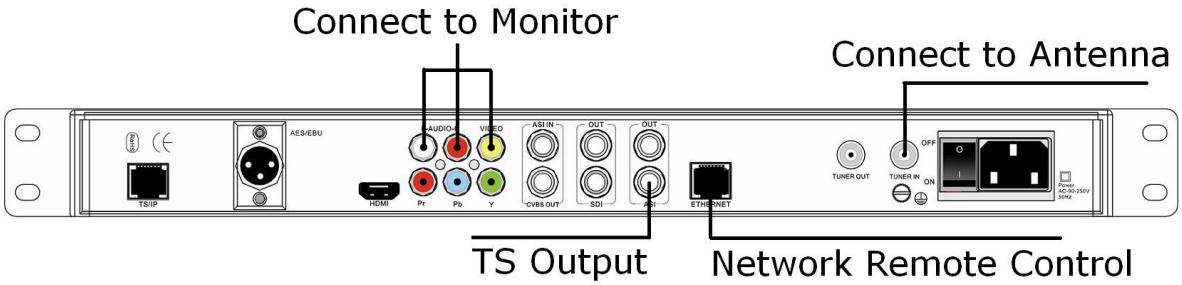
## Rear Panel



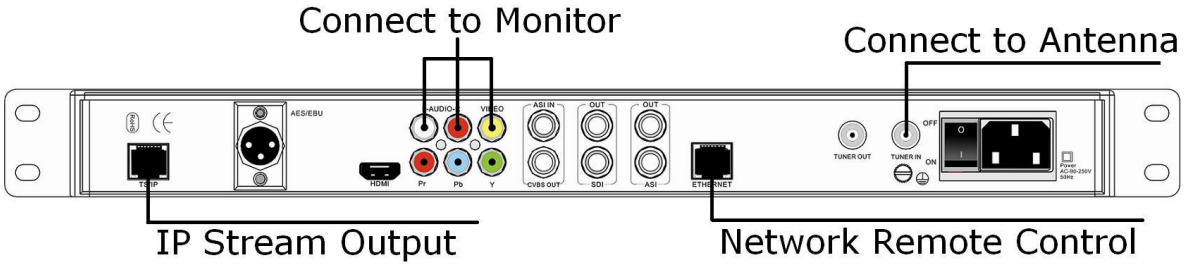

1. TUNER IN: Connect to a RF or IF signal.
2. TUNER OUT (LOOP OUT): Use it when connecting to another IRD.
3: ETHERNET: Network remote control.
4. ASI OUT: Output MPEG-2 or Mpeg-4 TS.
5. SDI OUT: Output the SDI Video stream.
6. ASI IN: BNC connector for TS input
7. VIDEO /AUDIO: Video signal output jack and Left/right audio output jack.
8. Cr/Cb/Y: Component output
9. HDMI: Output high quality picture and sound with one cable.
10. AES/EBU: Professional digital Audio output with XLR connector
11. TS/IP: TS stream input and output in IP format.
12. POWER SUPPLY and POWER SWITCH: 90~250V AC, 50Hz.

There are several ways of connecting the IRD to your existing Audio/TV system. We recommend using one of the following set-ups for best results:

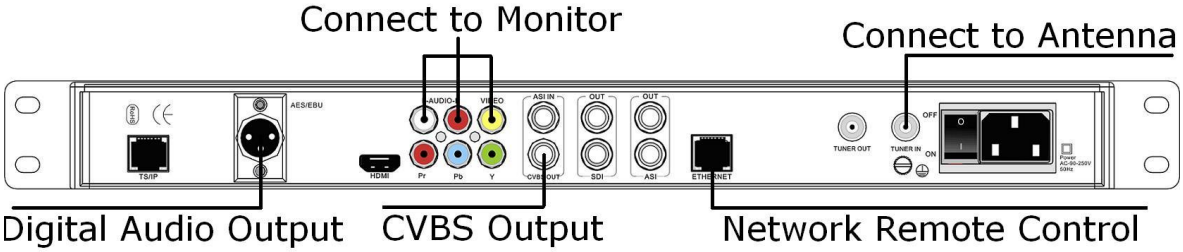
## Tuner in and ASI out



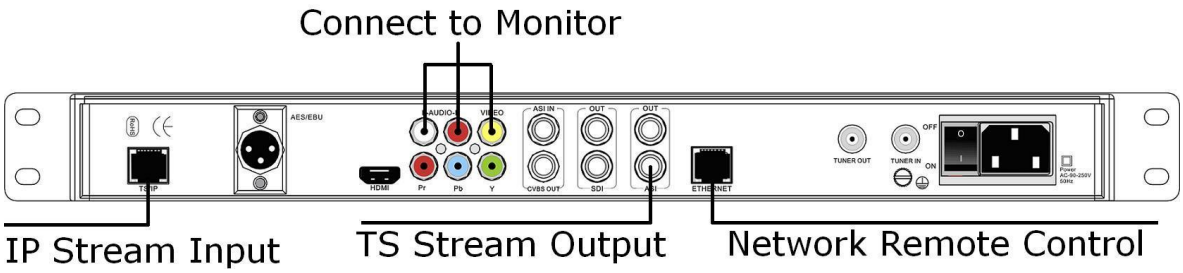

## Tuner in and IP out



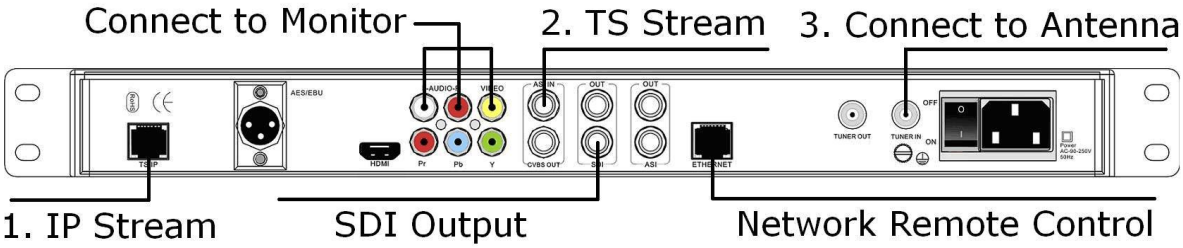

## Tuner in and CVBS out



## IP in and ASI out

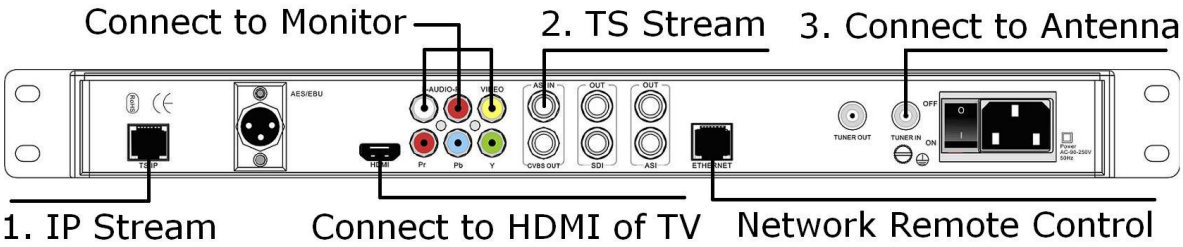



## Tuner/IP/ASI in and SDI out



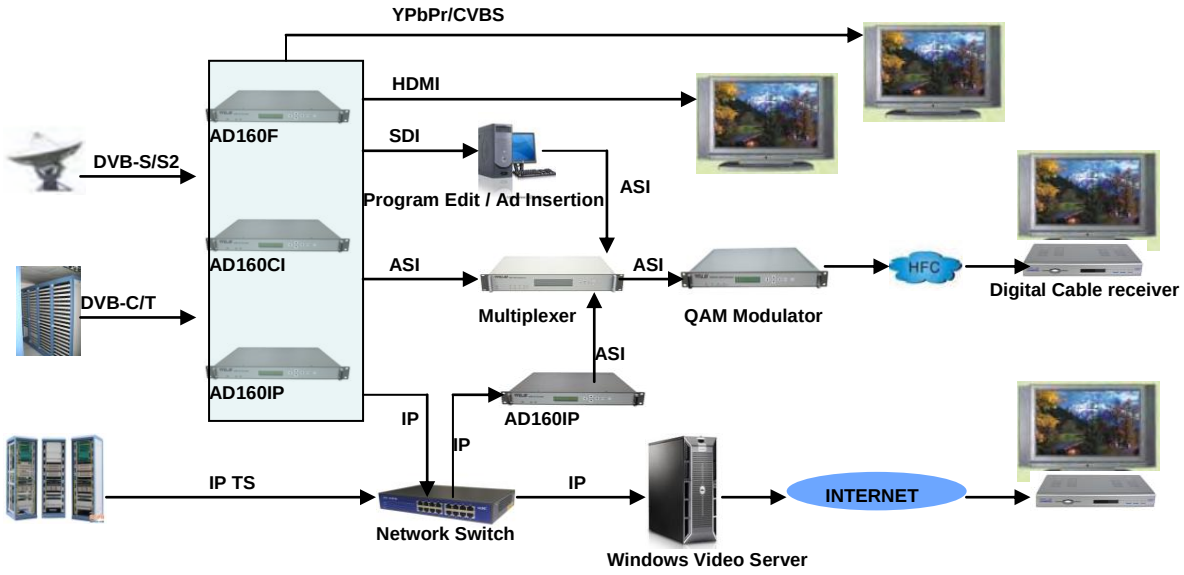

**Notice:** You should select one signal source from the 1, 2 and 3 option.

## Tuner/IP/ASI in and HDMI out

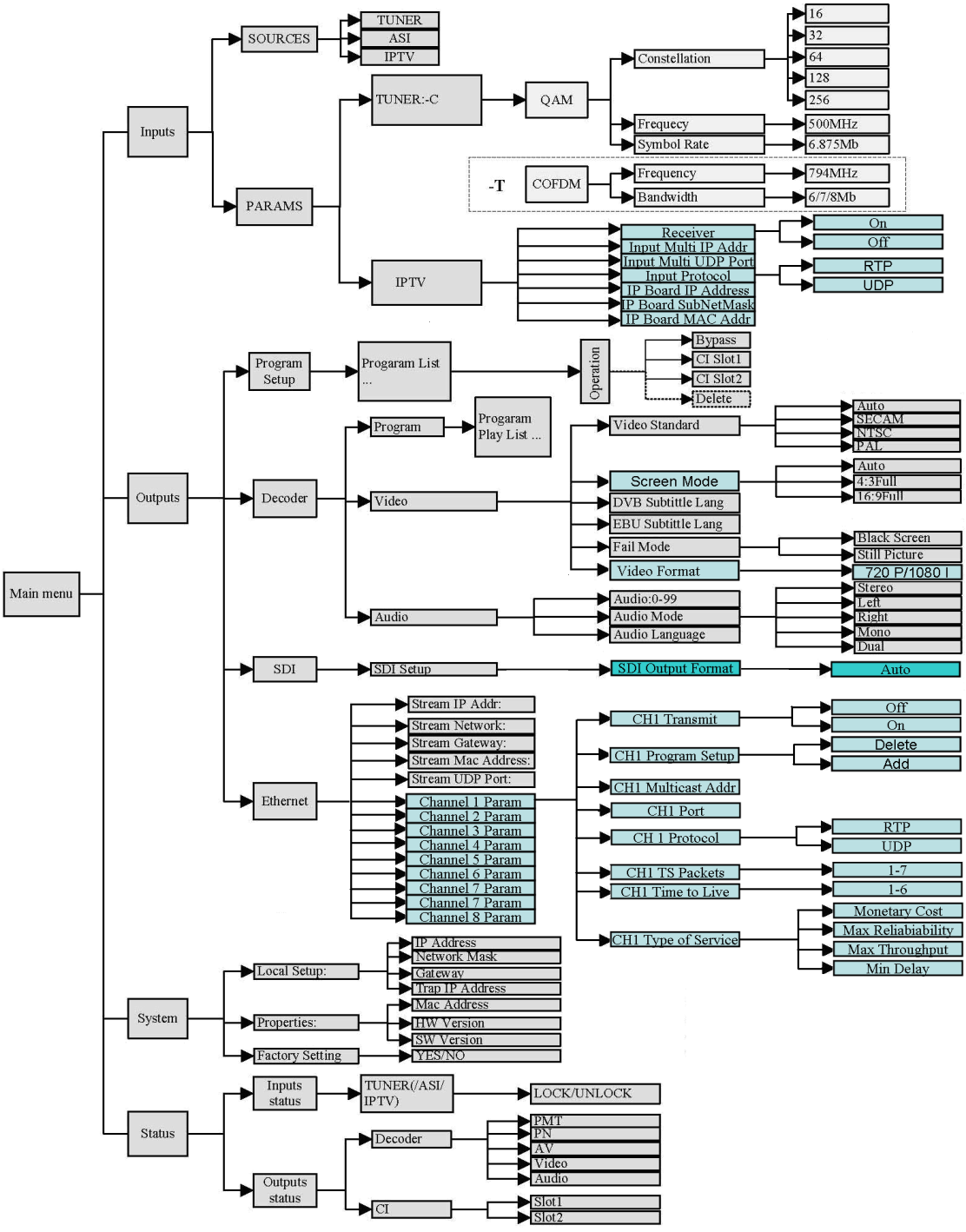



**Notice:** You should select one signal source from the 1, 2 and 3 option.

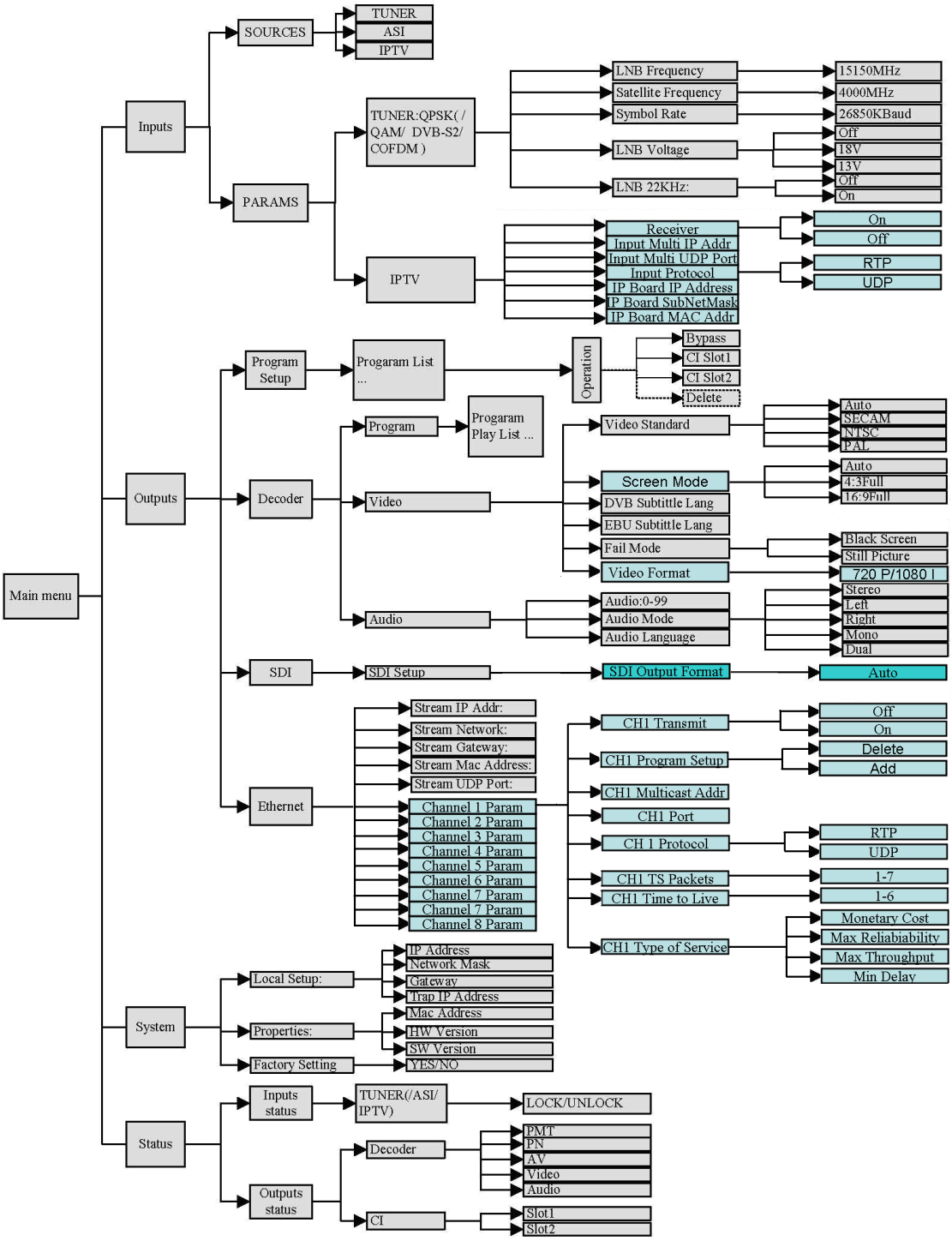
# System Connection Diagram



# Front Panel Control & Operation




**This diagram is for DVB-C and DVB-T IRD**




**This diagram is for DVB-S and DVB-S2 IRD**

## Input

In this menu, there are two submenus used to select the input source and configure the input parameters. They are SOURCES and PARAMS.

### Sources

In this submenu, there are three options, TUNER, ASI and IPTV.
**TUNER**: If you select this item, the IRD will search the signal from the tuner after configuration and exit at Params.
**ASI**: If you select this item, the IRD will search the signal from the ASI input port.
**IPTV**: If the signal from the IP port, you can select this item. The IRD will search channels after configuration and exit at Params.

### Parameters

In this submenu, there are two items, they are TUNER and IPTV. If your IRD is for DVB-C/T/S/S2 and IPTV, please select relative reception mode such as QAM, COFDM, QPSK and IPTV. According to different type IRD, please set different parameters.

**TUNER**

In this option, several parameters are required to setup.
1) For DVB-S/S2 (QPSK):

- LNB frequency: this is the LNB's local oscillation (LO) frequency, every LNB have one or two local oscillation frequencies which can be obtained from the LNB provider.
- Satellite frequency: This is the satellite down-conversion frequency, every transponder has one frequency, and you can get this parameter from the satellite programs provider.
- Symbol rate: Every transponder have one symbol rate, you can get this parameter from the satellite programs provider.
- LNB Voltage: LNB voltage is the power that supply to the LNB in order to receiver satellite signal with different polarization. Generally 18V is for horizontal while 13V is for vertical.
- LNB 22KHz: Generally 22K is used to control 22K Switch, typically used for LNB with double L.O in Ku band.

2) For DVB-C (QAM): you need to setup QAM model, Frequency and symbol rate.
3) For DVB-T (COFDM): you need to setup bandwidth and frequency.

**IPTV:**

When the receiver wants to receive the signal from the internet, you need to configure these parameters. For DVB-S/S2/C/T, this part is the same.

- Receiver: Select On or Off to open or close the IPTV function.
- Input Multi IP Addr: Set up the multicast IP address for receiving the IP signal.
- Input Multi UDP port: Set up the UDP port for receiving the IP signal.
- Input Protocol: Default setting.
- IP Board IP Address: Default setting.
- IP Board SubNetMask: Default setting.

- IP Board MAC Address: Default setting.

**Notice: When two or above pieces of AD160 are working in IPTV at the same time, you'd better set different '**IP Board IP Address**' and '**IP Board SubNetMask**' for each equipment.**

## Output

In this menu, there are three submenus including： Program Setup, Decoder and Ethernet.

### Program Setup

In this option, all the programs received will be list. By changing the program's status, you can determine whether to transmit the program or appoint a CI Slot to descramble the scrambled program.

- Bypass: Transmit the program without any disposal.
- CI slot1: If the program is scrambled, you can appoint the CAM card inserted in Slot 1 to descramble it. Under this condition, the program is transmitted in default.
- CI solt2: If the program is scrambled, you can appoint the CAM card inserted in Slot 2 to descramble it. Under this condition, the program is transmitted in default.
- Delete: Any program you don't want to transmit can be forbidden by selecting this status.

### Decoder

In this menu, there are three items: Program List, Video and Audio.

**Program List**:

All the programs received by the receiver will be list here, and you can select the program played via AV interface.

**Video**:

Configure the video parameter

- Video standard: in this item, you can select video standard including Auto, SECAM, NTSC and PAL.
- Screen Mode: set the screen aspect ratio in this item, it includes Auto, 4:3Full, 16:9Full.
- DVB subtitle Lang: English only
- EBU subtitle Lang: English only
- Fail Mode: include Black Screen and Still Screen. Black screen: when the receiver lost the signal, keep the screen black. Still screen: when the receiver lost the signal, keep the last picture on the screen.

- Video Format: set the video format in this item, it includes: Auto, 576 I, 720 P and 1080 I.

**Audio**:

Configure the audio parameter
- Audio:0-99
- Audio mode: include Stereo, Left, Right, Mono, Dual
- Audio Language: Select different audio language.

## SDI

The SDI output format is 'Auto' which means one audio channel is embeded in the SDI video output stream and you can't change it here.

## Ethernet

When select the IP port as the output, you need to setup some parameters in this submenu. There are 8 channels, and each can be used to output IP stream separately.
- Stream IP Addr: Default setting ( Reserve for the future)
- Stream Network: Default setting ( Reserve for the future)
- Stream Gateway: Default setting (Reserve for the future)
- Stream Mac Address: Default setting (Reserve for the future)
- Stream UDP port: Default setting (Reserve for the future)
- Channel 1 Param Setup:
  - CH 1 Transmit: Select Off or On to close or open the IP channel.
  - CH 1 Program Setup: For your operation convenience, all the input programs will be outputted via this IP channel and you can't add or delete programs here.
  - CH 1 Multicast Addr: Set up the multicast IP for broadcasting the IP signal
  - CH 1 Port: Set up the UDP or RTP port for broadcasting the IP signal
  - CH 1 Protocol: UDP/RTP
  - CH 1 TS Packets: Configuration range is 1—7 (7 is recommended)
  - CH 1 Time to Live: Configuration range is 1-255 (8 is recommended)
  - Ch 1 Type of Service: It includes Normal, Min delay, Monetary Cost, Max reliability, Max Throughput
- Channel 2 Param Setup:
  - CH 2 Transmit: Select Off or On to close or open the IP channel.
  - CH 2 Program Setup: Select Add to add the program to the IP channel, and select Delete to delete the program in the IP channel.
  - CH 2 Multicast Addr: Set up the multicast IP for broadcasting the IP signal
  - CH 2 Port: Set up the UDP or RTP port for broadcasting the IP signal
  - CH 2 Protocol: UDP/RTP
  - CH 2 TS Packets: Configuration range is 1—7 (7 is recommended)
  - CH 2 Time to Live: Configuration range is 1-5 (5 is recommended)
  - Ch 2 Type of Service: It includes Normal, Min delay, Monetary Cost, Max reliability, Max Throughput,
- Channel 3/ 4/ 5/ 6/ 7/ 8 Param Setup: The same as Channel 2

## System

Under this menu, there are three submenus including Local Setup, Properties and Factory Setting.

### Local Setup

- IP address: Local IP setting for connecting to the server. This IP and the server's IP should be in the same section.
- Network Mask: Network Mask setting for connecting to the server.
- Gateway: Gateway setting for connecting to the server.
- Trap IP address: This IP should be the same as the server's IP, before connection, it will verify the server's IP, if they are the same, the connection will be allowed.

### Properties

- Mac Address: Query the receiver's Mac Address.
- HW Version: Query the receiver's hardware version.
- SW Version: Query the receiver's software version.

### Factory Setting

Take the receiver back to factory setting.

## Status

There are two submenus under this menu: Input status and output status.

### Input status

Query the input status, lock or unlock.

### Outputs status

**Decoder:** In this item you can check the programs PMT, PN, AV, Video, Audio status.
**CI:** Check two CI status.

# NMS Control & Operation

Except using the front panel to configure and operate the equipment, AD160 also supplies the network management function. When you get the equipment, there should be a CD containing the network management software. If you want to control and operate the equipment via the network management software, please copy the software from the CD to your server (Computer).

## LAN parameters setting & connection establishment

Before logging on the equipment, you should use the front panel to configure the local network setting.

### Local network setting

Let's take an example to explain how to configure the local network for connection. We assume the server's IP is 192.168.1.2, network mask is 255.255.255.0 and gateway is 198.168.1.1. All these parameters in the equipment should be:

- IP address: Local IP setting for connecting to the server. This IP and the server's IP should be in the same section. For example is can be 192.168.1.x, x can be 3 to 254.
- Network Mask: Network Mask setting for connecting to the server. It should be the same as server's. 255.255.255.0.
- Gateway: Gateway setting for connecting to the server. It should be the same as server's. 198.168.1.1
- Trap IP address: This IP should be the same as the server's IP. Before connection, it will verify the server's IP, if they are the same, the connection will be allowed. It should be 192.168.1.2.

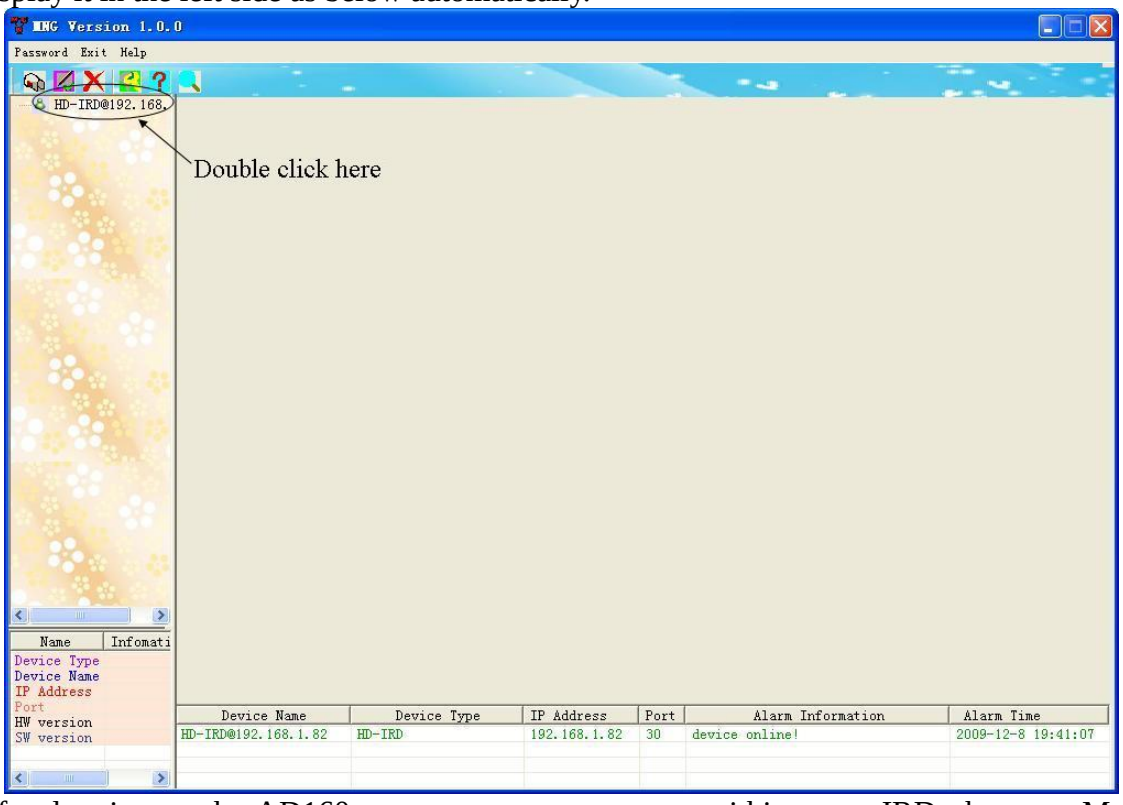
### Connection

Connect the server and equipment via Ethernet port with an Ethernet cable before running the network management software on the server. Then log on the NMS and enter the user name and password, the default user name and password both are "**admin"**, just as the following picture.

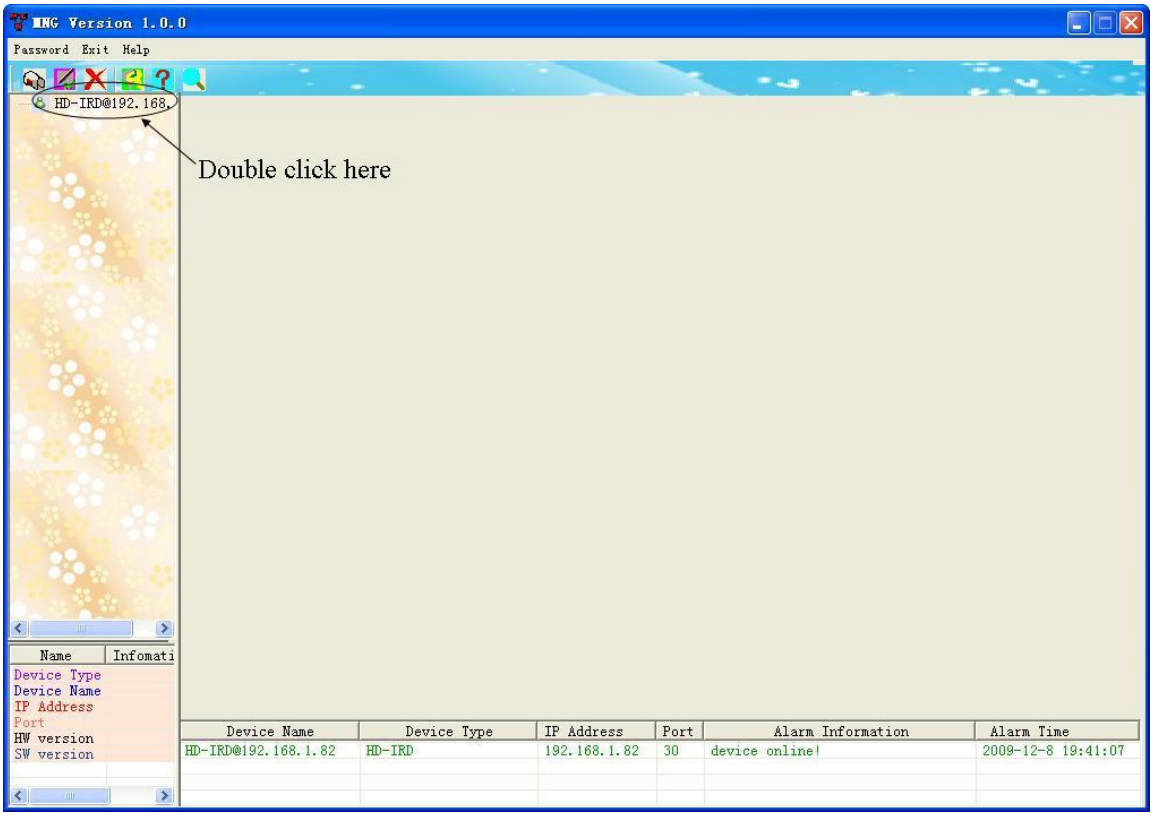
**Notice: this NMS can manage several pieces of AD160 at the same time, as long as these equipments are connected to the server via the Network Switch. Now we take one piece of AD160 for example to illustrate the operation.**

## NMS Main Interface Configuration

After logging in successfully, it'll search the AD160 which is connected to the server and display it in the left side as below automatically.




After logging on the AD160, you can see seven pages within every IRD, they are: Main Board, Audio/Video, Status, IP Board, Upgrade, System and Advance. Except that, there're two parts used to display some correlative information, just as the following picture.




## ➢ Main Board

- **SOURCES**

In this submenu, there are three options, TUNER, ASI and IPTV.

- **TUNER**: when select this item, the receiver will search the signal from the tuner, different IRD model may have different NMS interface and operation.
- **ASI**: when select this item, the receiver will search the signal from the ASI input port.
- **IPTV**: when the signal from the IP port, you can select this item.

- **Tuner selection**

In this item, you can set the parameters according to different tuner model, DVB-S (QPSK), DVB-S2 (8PSK), DVB-C (QAM) and DVB-T (COFDM).

According to your IRD model select correct tuner. Then setup parameters of frequency, symbol rate, LNB Voltage, LNB 22KHz, QAM model, bandwidth and so on. You can get these parameters from your program provider.

- **CI MultiDecrypt Mode**
  - MultiPMT: it's the default option, you needn't change it generally.
  - CombinePMT: if your CAM can't decrypt programs normally, you can try to select it.

- **Program List**
  - Refresh: update the programs from the input signal.
  - Default: get all the programs' Operation back to 'Bypass'.

In the programs list box, all the received programs will be list. There are three items

providing the programs information: Number, Name and Operation. Let's take Channel [V] (NO.21) for example to explain how to edit the programs.

Click the program which you want to edit (in the picture, it is Channel [V], NO.21), and then this program will be highlighted in blue, program number will show in "Program Number" item. Then click the down list menu in the "program operation" item to select the status you need.

**Explain:**

- ✓ Bypass: Transmit the program without any disposal.
- ✓ CI slot1: If the program is scrambled, you can appoint the CAM card inserted in Slot 1 to descramble it. Under this condition, the program is transmitted in default.
- ✓ CI solt2: If the program is scrambled, you can appoint the CAM card inserted in Slot 2 to descramble it.. Under this condition, the program is transmitted in default.
- ✓ Delete: Any program you don't want to transmit can be forbidden by selecting this status.

- **Play List**

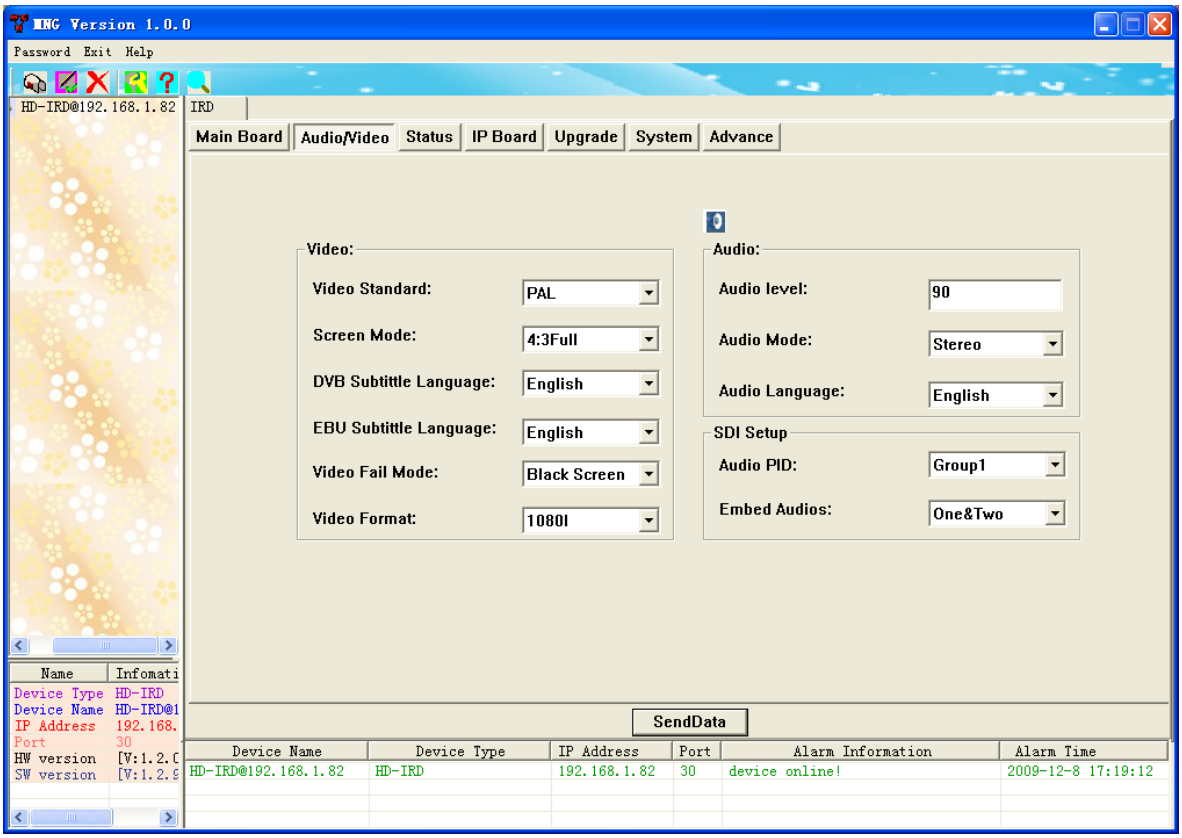
In this box, select the programs you want to play via AV interface, and then click "SendData" button to save the parameters, the programs you select will be played.

- **Playing program**

The information of the program played currently will appear here, such as PMT PID, Video PID, Audio PID and so on.

**Notice: After setting all the parameters for each page (including the following 6 pages), you should press 'SendData' to enable the new parameters.**

➢ **Audio/Video**




- **Video**
  - Video standard: in this item, you can select video standard including Auto, SECAM, NTSC and PAL.
  - Screen Mode: set the screen aspect ratio in this item, it includes Auto, 4:3 Full, 16:9 Full.
  - DVB subtitle Language: English only
  - EBU subtitle Language: English only
  - Video Fail Mode: include Black Screen and Still Screen. Black screen: when the receiver lost the signal, keep the screen black. Still screen: when the receiver lost the signal, keep the last picture on the screen.
  - Video Format: includes Auto, 576 I, 720 P and 1080 I.

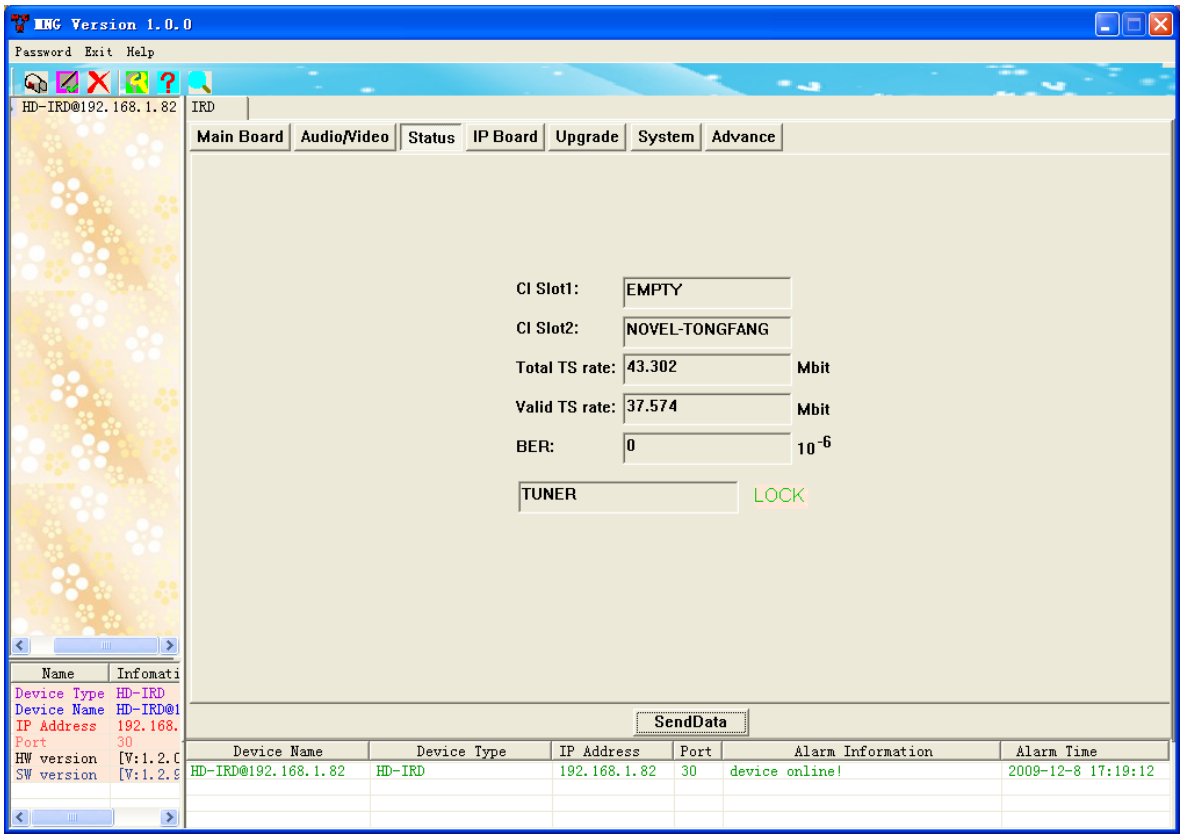
- **Audio**
  - Audio Level:0-99
  - Audio mode: include Stereo, Left, Right, Mono, Dual
  - Audio Language: Select different audio language.

- **SDI Setup**

They are not valid temporarily, and one audio channel is embedded in the SDI video output stream automatically.

➢ **Status**

This page is used to display the status of CI Slot, total input rate, valid input rate, BER (it'll won't affect the normal function in fact now) and tell you whether the input signal is locked or not.

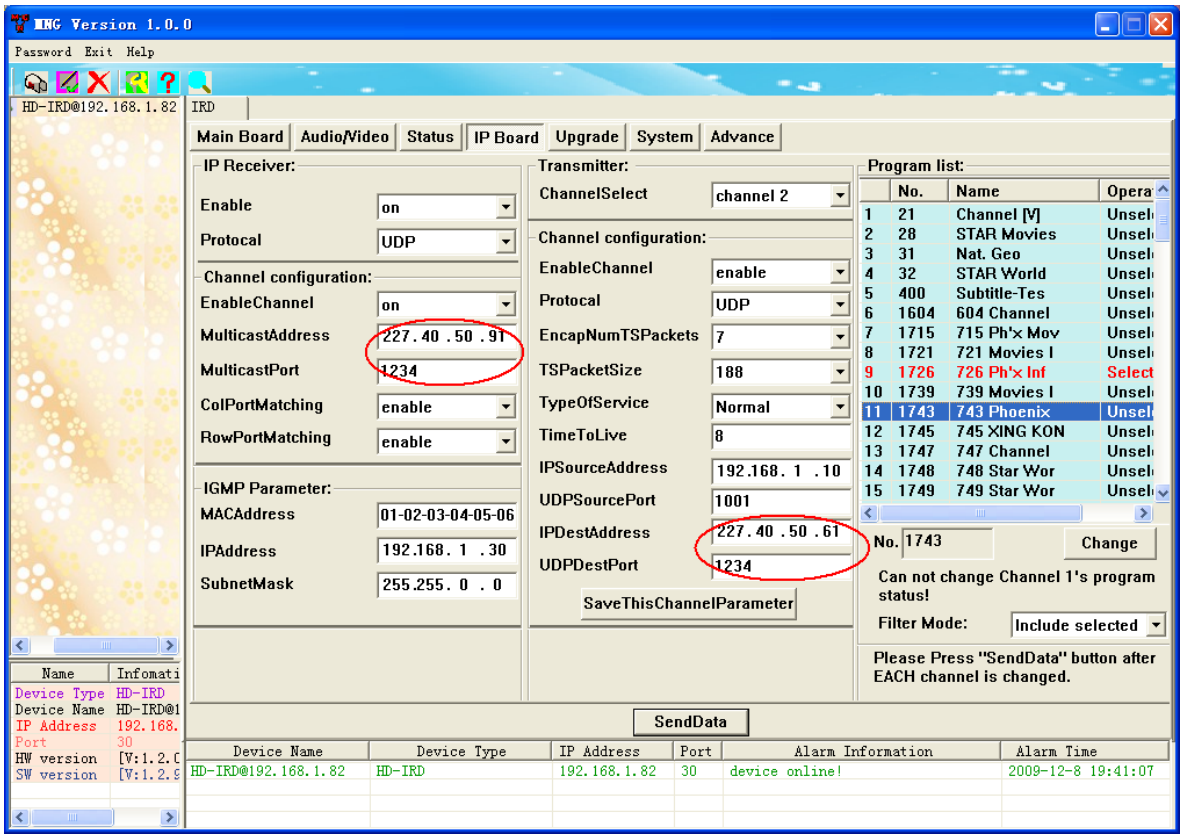



## ➢ IP Board

This page is used to configure the parameters for the IP function including 'IP Receiver', 'Transmitter' and 'Program List'.

**Notice: when you enable the 'IP Receiver', you must set the right 'MultiCastAddress' and 'MultiCastPort'. For example**

| | AD160_A | AD160_B |
|---|---|---|
| **Role** | **IP Transmitter** | **IP Receiver** |
| **Address** | **IPDestAddress:227.40.50.60** | **MultiCastAddress :227.40.50.60** |
| **Port** | **UDPDestPort: 1234** | **MultiCastPort : 1234** |




- **IP Receiver**
  - Enable: When the programs are from IP source, select on.
  - Protocol: Optional UDP and RTP according to your IP source.
  - Enablechannel: When the programs are from IP source, select on.
  - MulticastAddress: Set up the multicast IP address for receiving the IP signal.
  - MulticastPort: Set up the UDP port for receiving the IP signal.

  Other parameters: Default setting.

- **Transmitter**
  - ChannelSelect: Set up the IP channel number where you want to transmit programs.
  - EnableChannel: Enable or disable the IP channel.
  - Protocol: Optional UDP or RTP according your requirement.
  - EncapNum TSPackts: Configuration range is 1—7. (Number 7 is recommended).
  - TypeOfService: It includes Normal, Min delay, Monetary cost, Max reliability, Max Throughput,.
  - TimeToLive: Configuration range is 1-255. (Number 8 is recommended).
  - IPDestAddress: Set up the IP channel's multicast IP address for broadcasting the IP signal.
  - UDPDestPort: Set up the UDP port for the IP signal.

  Other parameters: Default setting.

**Note:**

**1. IP Channel 1 transmits all the input programs, which means you can't add or delete programs on IP channel 1. For other IP channels, you can edit the output program as**

**you wish by selecting it and pressing 'Change' button.**

**2. after setting all the parameters for one IP channel, you should press 'SaveThisChannelParameter' to save the setting of this channel.**

- **Program list**

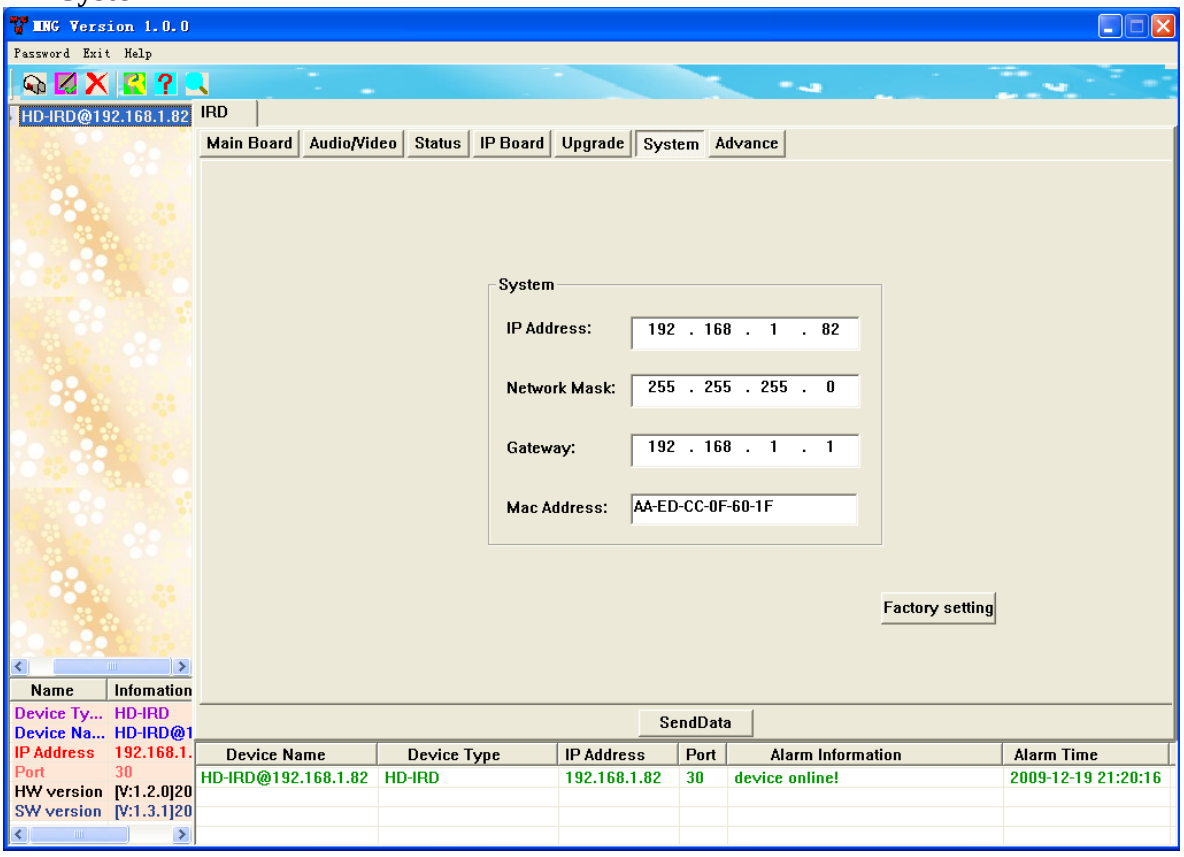
In this part, you can see the information of the programs which is in the selected channel. You can determine which program will be transmitted by changing the status of 'Operation' in the list.

➢ **Upgrade:**

It's convenient to upgrade the latest software via this NMS. Click 'Select File' button, select a desired document and click 'Start' the NMS will upgrade for AD160 automatically. You should restart the NMS after the upgrade.

If the upgrade is successful, a message 'Upgrade succeed! Please restart the software!'will pop up, and then the AD160 will restart automatically.

➢ **System**




- **System**
  - ◆ IP address: Local IP setting for connecting to the server. This IP and the server's IP should be in the same section.
  - ◆ Network Mask: Network Mask setting for connecting to the server.
  - ◆ Gateway: Gateway setting for connecting to the server.

- Mac Address: Query the receiver's Mac Address.

- **Factory setting**

Get all the parameters in the equipment back the default parameters.

- **Advance**

This option is designed for recording the information about the equipment, however, the option is not available now and reserved for the future.

# Troubleshooting

| Problem | Possible causes | What to do |
|---|---|---|
| The display on the front panel does not light up. | No power. | Check that the main cable is plugged into the power socket. |
| The front panel red light is on. AV has no output. | The unit is in standby mode or no output connection. | Check the output connection or Press the standby button. |
| | TV is not in AV mode. | Set TV in AV mode. |
| No or bad signal. | No cable connection or the program does not exist in the current satellite. | Check the cable connections, LNB and other equipment connected between the LNB and the STB, and /or adjust the dish. |
| | The satellite dish is not facing the satellite. | Adjust the dish. Check the signal level in the antenna setup menu. |
| Bad picture / Blocking error. | The satellite dish is not facing the satellite. | Adjust the dish. |
| | Signal is too strong. | Connect a signal attenuator to the LNB input. |
| | Signal is too weak. | Change to a larger dish. |
| | LNB noise figure is too high. | Change to a LNB with a lower noise figure. |
| | The LNB is defect. | Change the LNB. |

| Problem | Possible causes | What to do |
|---|---|---|
| Signal is good. But No picture and no audio. | The picture and audio are scrambled. | Change to a FTA channel. |

| | | |
|---|---|---|
| There is interference on your digital satellite channel. | The system is connected with RF leads and the output channel of the receiver interferes with an existing terrestrial channel or video signal. | Change the receiver output channel to a more suitable channel. |
| Network remote can not connect | IP stetting | Check the PC IP and equipment IP |
| | Cable is not good | Make sure the cable is good one and connect well. |
| No output on ASI or output unstable. | BNC Connection loosing. | Make sure that ASI output cable connect with the output port tightly. |
| Cannot Decrypt Programs. | Don’t select decrypted programs or select incorrectly. | Select decrypted programs to be correctly. |
| | CAM Modular Error. | Change for another CAM. |
| | Smart Card no right. | Contact the content provider. |
| | Incorrect insertion of CAM or Smart card. | Correctly insert CAM and Smart card. |

# Specifications

| | | | |
|---|---|---|---|
| **Tuner** | QPSK(8PSK) | Frequency Range | 950~2150MHz |
| | | Symbol Rate | 2~45Ms/s (2-37Ms/s for 8PSK) |
| | | Signal Strength | -65~-30dBm |
| | | FEC Mode Rate Demodulation | 1/2,2/3,3/4,5/6,7/8, QPSK, 8PSK |
| | QAM | Frequency Range | 50~858MHz |
| | | Symbol Rate | 0.87~6.9Ms/s |
| | | Signal Strength | 32-105dBuv |
| | | QAM model | 16/32/64/128/256 |
| | COFDM | Frequency Range | 48~858MHz |
| | | Symbol Rate | 0.87~6.9Ms/s |
| | | Signal Strength | -92~-20dBm |
| | | Bandwidth | 6/7/8M |
| **Audio** | | Audio Decoding | MPEG-1 layer I & II |
| | | Audio Mode | Mono/Dual Channel/Stereo |
| | | Connectors | RCA (L , R), XLR(L,R), |
| **Video** | | Video Decode | MPEG-II ISO/IEC 13818-2, Mpeg-4 AVC/H.264 |
| | | Input Bit Rate | <=15Mbps |
| | | Output System | PAL/NTSC/SECAM |
| | | Video Resolution | 720×576 |
| | | Connectors | RCA (CVBS, YPbPr), HDMI, SDI |
| **IP/TS output** | | Connectors | BNC, RJ45 |
| | | Interface Type | ASI, IP |
| | | Impedance | 75Ω |
| | | Packet | 188/204 |
| | | Bit rate | 1~72Mbps |
| | | TS Format | Single / Multiple programs |
| | | IP output | Unicast /Multicast IP stream |
| **IP/TS input** | | Connectors | BNC, RJ45 |
| | | Interface Type | ASI, IP |
| | | Bit rate | Up to 82Mbps |
| **Working condition& Physical Specification** | | Power supply voltage | AC: 90~250V, 50Hz/60Hz |
| | | Power consumption | 20W(Max) |
| | | Temperature | 0℃~40℃ |
| | | Humidity | 10%~90% |
| | | Size (W×D×H) | 42mmH×484mmW×335mmD |
| | | Net Weight | 3.7 Kg |